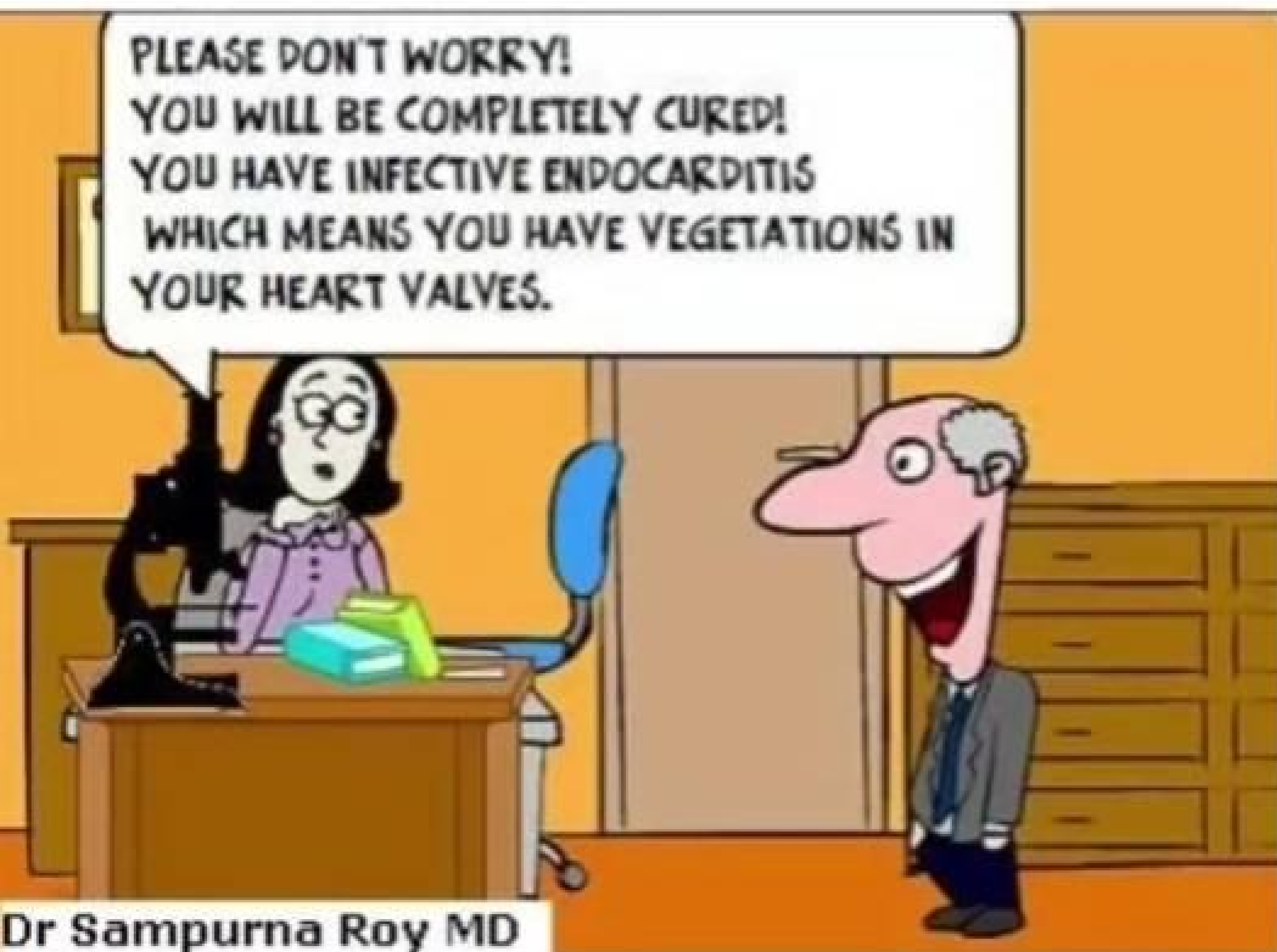




INFECTIVE ENDOCARDITIS



Table 14.6

Classification of endocarditis.

A. NON-INFECTIVE

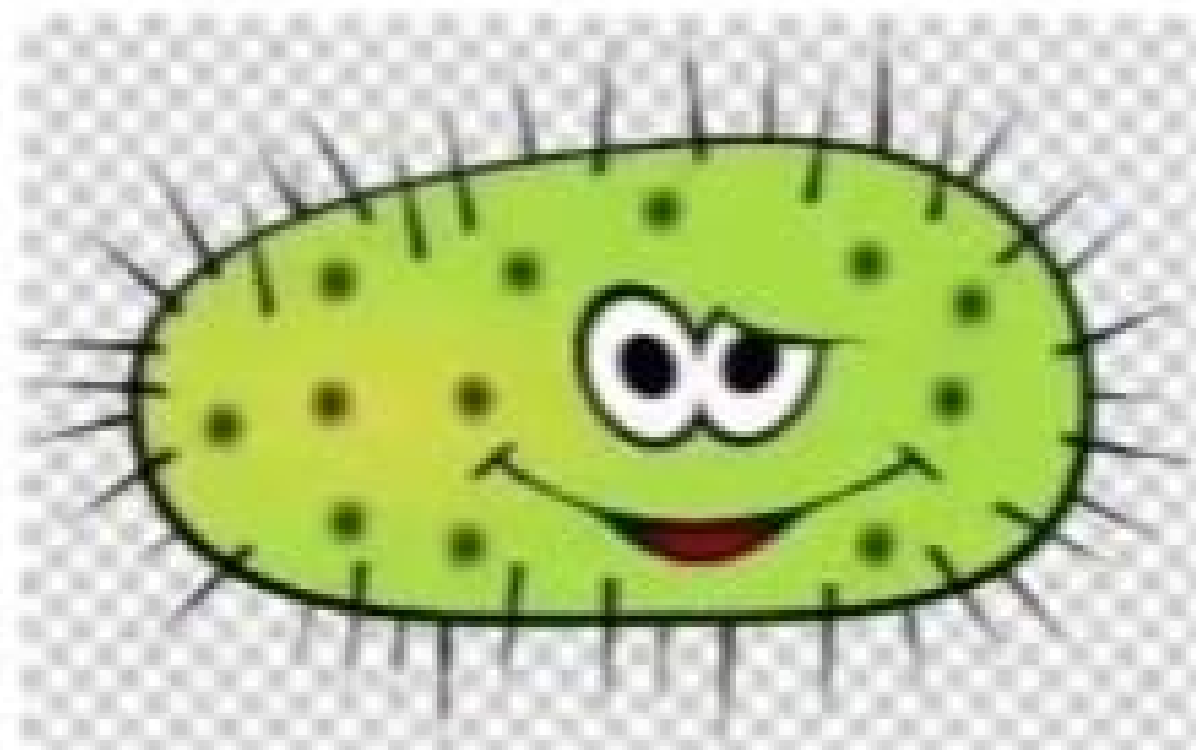
1. Rheumatic endocarditis (page 420)
2. Atypical verrucous (Libman-Sacks) endocarditis
3. Non-bacterial thrombotic (cachectic, marantic) endocarditis

B. INFECTIVE

1. Bacterial endocarditis
2. Other infective types (tuberculous, syphilitic, fungal, viral, rickettsial)

“ Microbial infection of the heart valves or the mural endocardium that leads to the formation of vegetations composed of thrombotic debris & organisms, often associated with destruction of the underlying cardiac tissues.”

- Affects the aorta, aneurysms, other blood vessels, Prosthetic devices etc
- Mc causative organisms – Bacteria
Fungi & other agents – less common



- Prompt diagnosis, identification of the offending agent & effective treatment ----- reduces mortality & morbidity

- Infective endocarditis---- 2 types

1. **Acute**

2. **Subacute**

Acute IE

- Infection of a previously **normal** valve by a **high virulent organism**
(Staph aureus)
- Necrotizing & destructive lesions
- Antibiotics alone – cannot cure
- May require surgery
- Death may occur

Subacute IE

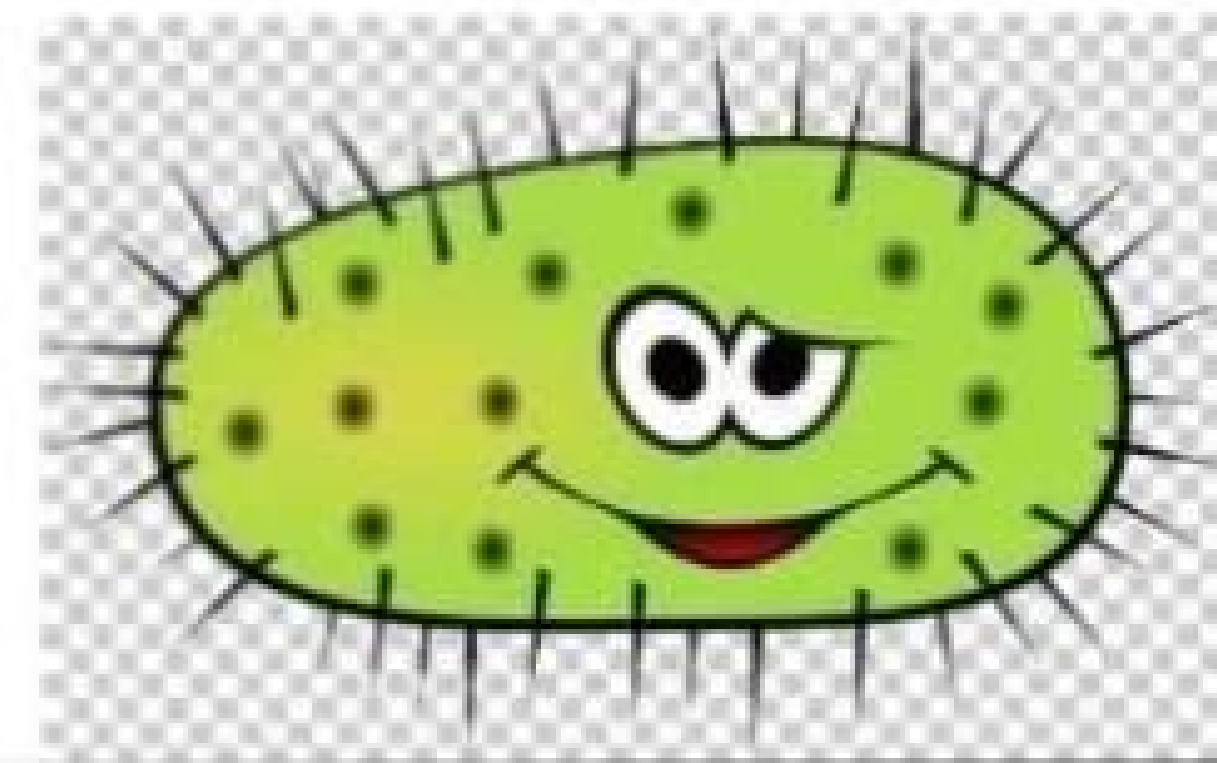
- Infection of **deformed** valves by a **low virulence organism**.
(Viridans Streptococci)
- Cured by antibiotics

Pathogenesis

- Predisposing factors
 - Rheumatic heart disease
 - Mitral valve prolapse
 - Degenerated calcific valvular disease
 - Bicuspid aortic valve
 - Prosthetic valves
 - Unrepaired/repared congenital defects

- Common causative organisms:

- Staph aureus (IV drug abusers), Staph epidermidis (Prosthetic valve)
- Strept viridans
- Enterococci
- HACEK group- Hemophilus
 - Actinobacillus
 - Cardiobacterium
 - Eikenella
 - Kingella
- Gram neg Bacilli & fungi



- 10% of all cases of infective endocarditis---- no organism isolated from blood

CULTURE NEGATIVE ENDOCARDITIS

- Reasons: Prior antibiotic therapy
Difficulties in isolation
Deeply embedded organisms

- Source of infection

- Dental/surgical procedure
- Contaminated needle sharing
- Trivial breaks in epithelial barrier of gut, oral cavity or skin



Morphology

“Vegetations on heart valves”

- Classic Hallmark of infective endocarditis
- Friable, bulky, potentially destructive lesions----contains fibrin, inflammatory cells, bacteria or other organisms
- MC sites- aortic & mitral valves
- Single/multiple
- May erode underlying myocardium
- Form emboli---- abscess at lodged site--- **SEPTIC INFARCT/ MYCOTIC ANEURYSM**

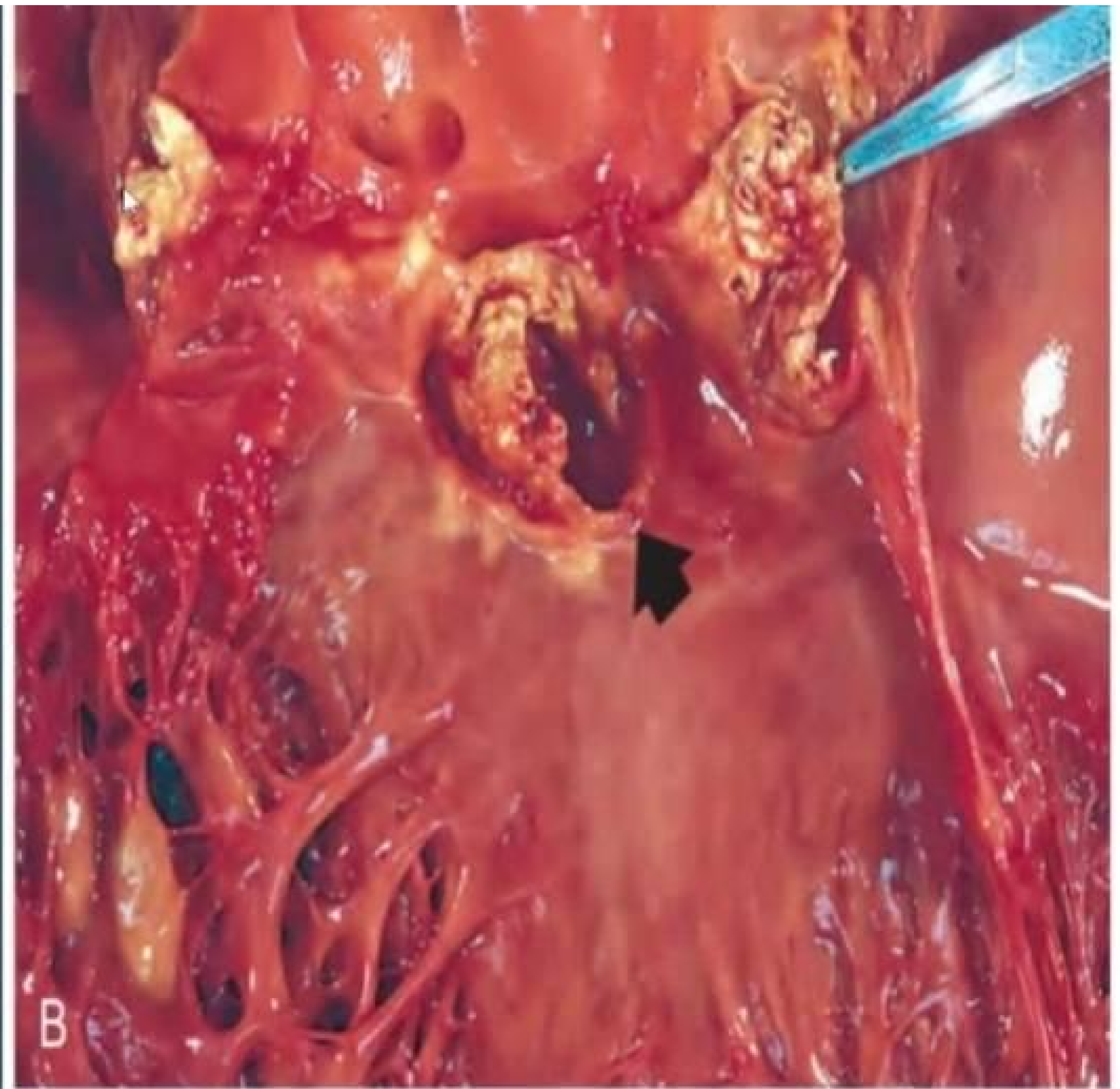


Figure 12-25 Infective (bacterial) endocarditis. **A**, Endocarditis of mitral valve (subacute, caused by *Streptococcus viridans*). The large, friable vegetations are denoted by arrows. **B**, Acute endocarditis of congenitally bicuspid aortic valve (caused by *Staphylococcus aureus*) with extensive cuspal destruction and ring

- Microscopy:
- the vegetations of BE consist of **3 zones**
- i) The outer layer or cap consists of **eosinophilic material composed of fibrin and platelets.**
- ii) Underneath this layer is the basophilic zone containing **colonies of bacteria**
- iii) The deeper zone consists of **non-specific inflammatory reaction** in the cusp itself, and in the case of SABE there may be **evidence of repair**

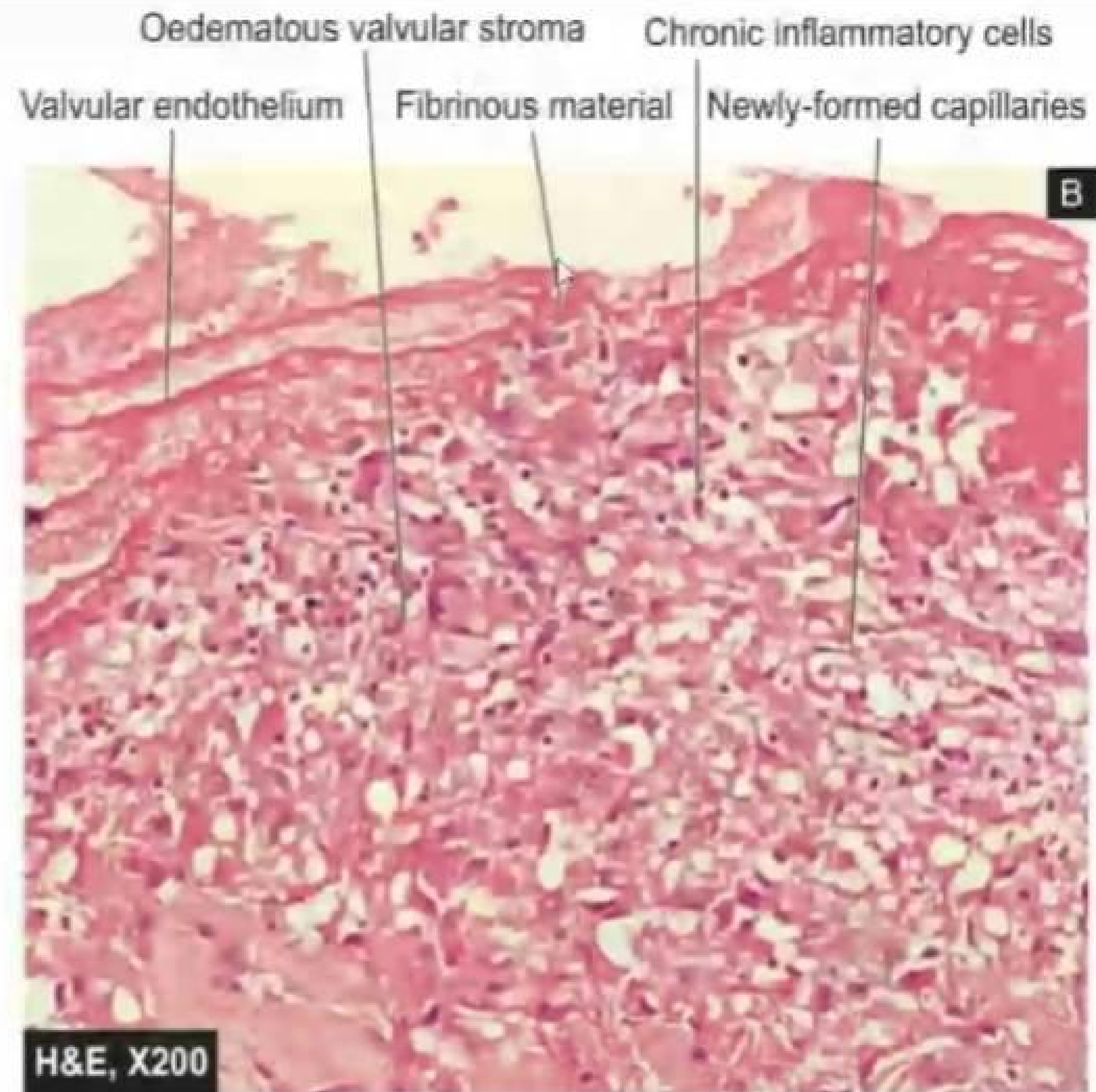
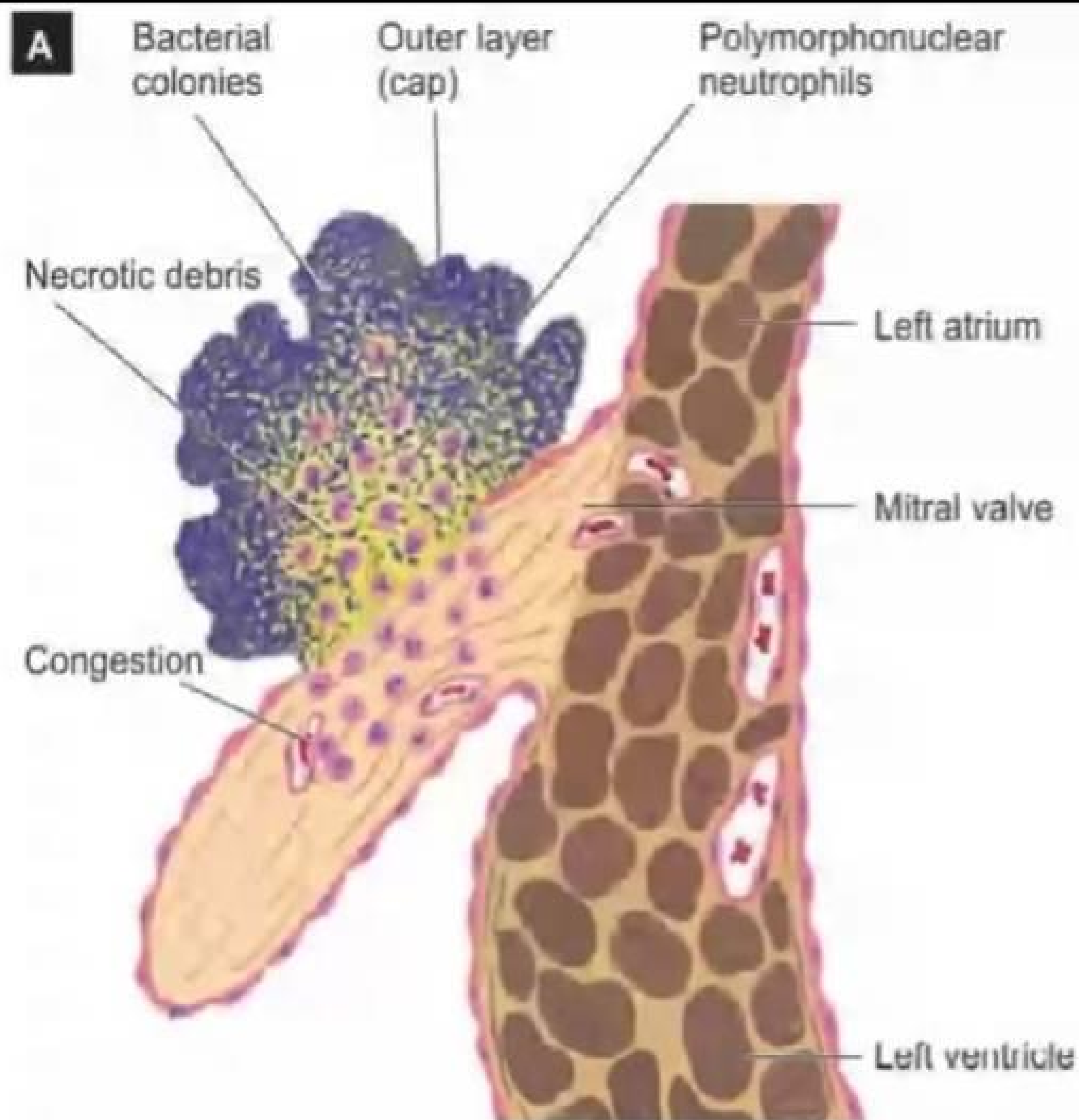


Figure 14.30 Infective endocarditis. A, Microscopic structure of a vegetation of BE on the surface of mitral valve in sagittal section. B, Section of the mitral valve shows fibrin cap on luminal surface, layer of bacteria, and deeper zone of inflammatory cells, with prominence of neutrophils.

-
- Vegetations in Subacute---- less destructive compared to acute
 - Granulation tissue at their bases--- healing--- fibrosis---calcification--- chronic inflammatory infiltrate

Diagnosis

- **Modified Duke's Criteria**
- **Pathologic criteria**
- **Clinical criteria:**
 - 2 major, 1 major + 3 minor, or 5 minor criteria

Table 12-9 Diagnostic Criteria for Infective Endocarditis*

Pathologic Criteria

Microorganisms, demonstrated by culture or histologic examination, in a vegetation, embolus from a vegetation, or intracardiac abscess
Histologic confirmation of active endocarditis in vegetation or intracardiac abscess

Clinical Criteria

Major

Blood culture(s) positive for a characteristic organism or persistently positive for an unusual organism
Echocardiographic identification of a valve-related or implant-related mass or abscess, or partial separation of artificial valve
New valvular regurgitation

Minor

Predisposing heart lesion or intravenous drug use
Fever
Vascular lesions, including arterial petechiae, subungual/splinter hemorrhages, emboli, septic infarcts, mycotic aneurysm, intracranial hemorrhage, Janeway lesions[†]
Immunological phenomena, including glomerulonephritis, Osler nodes,[‡] Roth spots,[§] rheumatoid factor
Microbiologic evidence, including a single culture positive for an unusual organism
Echocardiographic findings consistent with but not diagnostic of endocarditis, including worsening or changing of a preexistent murmur

-
- **Janeway lesions** --- small erythematous or hemorrhagic, macular, nontender lesions on the palms and soles
 - **Osler nodes** --- small, tender subcutaneous nodules that develop in the pulp of the digits or occasionally more proximally in the fingers and persist for hours to several days
 - **Roth spots** --- oval retinal hemorrhages with pale centers

Complications

- Glomerulonephritis
- Microthromboemboli
- Janeway lesions
- Osler's nodes
- Roth spots

Osler Node



Janeway Lesion



Table 14.7**Distinguishing features of acute and subacute bacterial endocarditis.**

FEATURE	ACUTE	SUBACUTE
1. <i>Duration</i>	<6 weeks	>6 weeks
2. <i>Most common organisms</i>	<i>Staph. aureus</i> , β -streptococci	<i>Streptococcus viridans</i>
3. <i>Virulence of organisms</i>	Highly virulent	Less virulent
4. <i>Previous condition of valves</i>	Usually previously normal	Usually previously damaged
5. <i>Lesion on valves</i>	Invasive, destructive, suppurative	Usually not invasive or suppurative
6. <i>Clinical features</i>	Features of acute systemic infection	Splenomegaly, clubbing of fingers, petechiae

Table 14.8 Distinguishing features of vegetations in major forms of endocarditis.

FEATURE		RHEUMATIC	LIBMAN-SACKS	NON-BACTERIAL THROMBOTIC	BACTERIAL (INFECTIVE)
1.	<i>Valves commonly affected</i>	Mitral alone; mitral and aortic combined	Mitral, tricuspid	Mainly mitral; less often aortic and tricuspid	Mitral; aortic; combined mitral and aortic
2.	<i>Location on valve cusps or leaflets</i>	Occur along the line of closure, atrial surface of atrioventricular valves and ventricular surface of semilunar valves	Occur on both surfaces of valve leaflets or cusps, in the valve pockets	Occur along the line of closure	SABE more often on diseased valves; ABE on previously normal valves; location same as in RHD
3.	<i>Macroscopy</i>	 Small, multiple, warty, grey brown, translucent, firmly attached, generally produce permanent valvular deformity	 Medium-sized, multiple, generally do not produce significant valvular deformity	 Small but larger than those of rheumatic, single or multiple, brownish, firm, but more friable than those of rheumatic	 Often large, grey-tawny to greenish, irregular, single or multiple, typically friable
4.	<i>Microscopy</i>	Composed of fibrin with superimposed platelet thrombi and no bacteria. Adjacent and underlying endocardium shows oedema, proliferation of capillaries, mononuclear inflammatory infiltrate and occasional Aschoff bodies.	Composed of fibrinoid material with superimposed fibrin and platelet thrombi and no bacteria. The underlying endocardium shows fibrinoid necrosis, proliferation of capillaries and acute and chronic inflammatory infiltrate including the haematoxylin bodies of Gross.	Composed of degenerated valvular tissue, fibrin-platelets thrombi and no bacteria. The underlying valve shows swelling of collagen, fibrinoid change, proliferation of capillaries but no significant inflammatory cell infiltrate.	Composed of outer eosinophilic zone of fibrin and platelets, covering colonies of bacteria and deeper zone of non-specific acute and chronic inflammatory cells. The underlying endocardium may show abscesses in ABE and inflammatory granulation tissue in the SABE.

THANK YOU

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